

ing this incision of the drum membrane, the symptoms did not wholly abate and had another paracentesis seven days later. Indefinite pain back of the ear and some temperature.

Examination by myself: Right ear, some discharge from this ear. No pain over the tip or on this side of the head. Bulging of the posterior, inferior wall, (which happens very seldom.) Nystagmus to the opposite side and to the same side. Some tinnitus. Hearing good. Tuning fork: Weber to the bad ear; Rinne negative in the bad ear. Seven foot hearing tube positive. Both ears reacted in the normal way to cold water. Facial intact.

My diagnosis: Acute mastoiditis requiring immediate operation.

My reasons for same were as follows:

1st—Nystagmus in the midst of a discharging ear.

2nd—Bulging of the posterior, inferior quadrant, which indicated pus retention.

3rd—Persistent temperature with a discharging ear.

The symptoms that I could not explain and thought were accidental were hiccough; at times, there was a something that simulated an epileptiform seizure. Thought this in some way due to a reflex, or possibly to a brain abscess.

Operative findings rather large, pneumatic mastoid. All cells contained pus, some under pressure. A deep cell well into the petrous portion of the temporal bone and below the bony meatus. (This cell produced the bulging from below, upwards.) The dura of the middle fossa uncovered and healthy. The sinus accidentally uncovered.

The following two days, the patient was much improved. Less vertigo, no pain, less temperature. On the third day was not so well. An increase of temperature; vertigo. Dressings changed. Fourth day, more temperature; vertigo increased. A spell of hiccough and a seizure, simulating epilepsy. At this time, I thought that probably I had injured the sinus at operation and that a mural clot was keeping up the temperature, or that in doing a dressing the patient had become infected. During the time that this was going on, he would have frequent spells of hiccough and an occasional seizure.

There were no signs of meningitis or brain abscess, with the exception of the seizures and the hiccough. Nevertheless, you will note from the temperature chart that two days prior to this, the temperature fell on two successive days to normal or below and again rose to almost 103°. So in the hope of finding something, this second operation was done.

We concluded to explore the sinus for possible infection. This was done on the 24th day of March, twelve days following the first mastoid operation.

Findings: perfectly healthy in every particular. Following this procedure, the temperature increased. All the symptoms increased, with new ones which indicated a very grave prognosis. He grew rapidly worse and died in a few days.

Now the question naturally follows—what was the cause of the man's death?

The bacteriological findings of the pus from the ear by repeated examinations, showed a mixed infection with nothing suggestive.

Blood examinations repeatedly—everything negative.

Lumbar puncture—negative findings The pressure was not materially increased.

Brain abscess a possibility, with a decided leaning to a cerebellar tumor at this time.

At autopsy were found most remarkable scattered, grayish nodules at the cortex about one-half c. m. in diameter. These looked at first like multiple tumors, but were found to be tubercles. There was a secondary involvement wholly of the right lung by miliary tubercles. There was no obvious old focus in the lung. It was difficult even at autopsy to explain the predominant symptoms. They have to be referred to involvement of the cerebellar and pons. Cortical tuberculosis gave no signs. The spread of miliary tuberculosis of the right lung was a terminal event. The ear signs were never prominent and would at no time explain all the dizziness, hiccough, or peculiar respiratory symptoms. The operations on the mastoid and sinus were done chiefly because of the temperature, which could not well be explained by what was found on clinical examination. Internal ear intact; sinus healthy.

While this particular case was hopeless from the very beginning, it illustrates beautifully how careful one must be in the analysis of the entire case as a whole.

During the entire case, Dr. Moffitt would say at various times that he believed there was a new growth in the small brain. I contended on the other side that had he a tumor of the small brain, he should have errors in his pointing, and the nystagmus would be more pronounced and definite. Furthermore, the caloric reactions were always as they should be, and if had a tumor, it must be a brain abscess in the presence of the suppurating ear. However, he had no ear symptoms to indicate the same.

As was shown at autopsy, there were large numbers of miliary tubercles all through the cerebellum and through the entire brain, lungs, the liver, the kidneys, everywhere. In fact, this individual (apparently in perfect health), was riddled with the miliary tubercles.

The brain symptoms that he had, we easily explained. The wonder was that he did not have more and that he lived so long.

COLLOIDAL MASTIC REACTION OF CEREBROSPINAL FLUID.

ERNST ALBRECHT VICTORS, M. D., San Francisco.

Emmanuel¹ has suggested a new spinal fluid reaction in the study of nervous syphilis. Influenced by the high susceptibilities of colloidal gold to the action of certain fluid proteins and extraneous colloids, and the difficulties encumbering the

1. Emmanuel—Berliner Wochenschrift. Vol. 52, no. 30, p. 792.

preparation of a proper gold solution reagent, a simple colloidal reaction is presented.

A Mastic suspension, extensively used by Neisser and Friedman in immune colloid studies, is used as a gold substitute. This Mastic suspension when properly prepared is very sensitive to electrolyte action and is immediately precipitated by sodium chloride. It appears that there exists in normal cerebrospinal fluids a colloid inhibitive to the Mastic precipitating action of salt solution of certain concentration. On the other hand, there appears to be a precipitating antibody colloid in the fluids of syphilitics of brain and chord involvement.

THE TEST.

Stock Mastic Solution: 10 g. of gum Mastic are dissolved in 100 c.c. of absolute alcohol. Filter. This solution keeps indefinitely.

Aqueous Mastic Suspension: 1 c.c. of stock Mastic solution dissolved in 9 c.c. of absolute alcohol. Rapidly insufflate this in 40 c.c. of ordinary distilled water. The rapid addition of Mastic to water is important. If added slowly a thick, turbid emulsion is formed hardly susceptible to electrolyte action. This solution must be freshly prepared.

Salt Solution: 1.25% sodium chloride. 1 c.c. of this will immediately precipitate 1 c.c. of Mastic solution.

Cerebrospinal Fluid: Steel needle may be used. A few red cells do not interfere with the reaction. The fluid will remain unchanged in the ice-chest for a week provided that it be not contaminated.

The Reaction: Set up 5 tubes, placing 1.5 c.c. salt solution in the first tube and 1 c.c. in each of the remaining tubes. Add 0.5 c.c. spinal fluid to tube 1 and after thorough mixing transfer 1 c.c. to tube 2, continuing transfer except that the c.c. from tube 4 is discarded and no fluid enters control tube 5. 1 c.c. of the aqueous Mastic solution is now added to each tube. The spinal fluid quantities in the several tubes will be:

Tube 1—0.25 c.c.

Tube 2—0.125 c.c.

Tube 3—0.062 c.c.

Tube 4—0.031 c.c.

Tube 5—None (control)

The tubes are allowed to remain at room temperature and strongly reacting fluids may be read within a short time. Allow the tubes to stand for 12 hours before making negative readings. In tube 5 there will occur an immediate precipitation of Mastic in dense flakes with a clear supernatant fluid. With strongly reacting fluids a like precipitation takes place in all tubes.

Gradations of reactions may occur where precipitation from tube 4 to tube 1 may take place. An irregularity in reaction may be observed in that precipitation may be skipped and appear in the tube above. Such irregular results are common of colloidal reactions and also observed in the Lange test.

CLINICAL OBSERVATIONS.

Emmanuel reports the findings in 32 cases with a constantly positive reaction in 14 cases of brain and cord syphilis. In 4 of 18 instances of non-

syphilitic diseases of the nervous system did a slight reaction occur.

I am presenting several series of cerebrospinal fluid studies in which the Mastic test was done together with the fluid Wassermann, Globulins, Cell count and blood Wassermann, and the Lange Colloidal Gold Test in some instances. A large series of these fluids are from the San Quentin Penitentiary, the majority of them being from non-syphilitic cases and the fluid withdrawn in spinal anesthesia. Certain fluids have been collected from Agnews State Hospital, and the remainder from my private practice.

Normal Fluids: Of 130 fluids withdrawn for spinal anaesthesia from apparently non-syphilitic individuals was the reaction negative, together with the blood and fluid Wassermann in 127 instances. One positive case gave also a weak blood and fluid Wassermann. One case of pulmonary tuberculosis with pleural effusion gave a weak Mastic precipitation. Of the entire series only one case in which it was felt that syphilis could be excluded, did a strong Mastic precipitate occur. (Table I.) Of 7 cases given a definite history of syphilitic infection with a positive blood Wassermann in some instances but without clinical manifestations of nervous involvement, was the fluid Mastic, together with other fluid tests, negative in all instances. (Table VIII.)

Non-Syphilitic Diseases of Nervous System.—In epilepsy, manic depression insanity, dementia precox, disseminated sclerosis, traumatic neurosis, neurasthenia, cerebral arterio-sclerosis and other non-specific conditions were the Mastic and Wassermann reactions constantly negative. A ventricle seepage fluid from a case negative to the usual syphilis tests gave a distinct precipitate. This fluid was turbid with leucocytes which probably affected an electrolyte action. In tuberculous meningitis was a slight precipitate also observed, quite similar to the Colloidal Gold curve. (Table II.) Certain clinically doubtful cases were readily diagnosed serologically except for a relatively high cell count in some fluids otherwise negative. (Table VII.)

Paresis, Cerebral and Cerebrospinal Syphilis.—Twenty-one of 23 parietic fluids produced a rapid and complete precipitation. One negative fluid was negative also to the blood and fluid Wassermann. It is probable that this was a fluid of the Plaut type. In one case precipitation occurred only in two tubes. (Table III.) In cerebral and cerebrospinal syphilis does the fluid likewise allow a rapid Mastic precipitate. (Tables V and VI.)

Tabes.—Fifteen tabetic fluids reacted actively in all but one instance. In this, precipitation occurred only in the last two tubes. It is of interest to note that most of these cases were under active treatment. (Table IV.)

I am presenting this test with a considerable degree of enthusiasm because it has reacted positively in a large percentage of syphilitic fluids and at times only suggestively in nonsyphilitic fluids. I am also happy to present a test strikingly simple and unencumbered by the necessity of having available elaborate apparatus or demanding faultless

precision in technic. It is my hope to stimulate more frequent spinal fluid observations in the management of syphilitics and I would suggest that a fluid cell count and Mastic test should from time to time be afforded such cases under our care. Such simple tests can be accepted as an index of

nervous involvement and should be a part of routine observation.

This test of Emmanuel, as it is here given, has not the delicate differential possibilities of the Lange Gold test. I have purposely not varied the author's technic although certain modifications are suggested whereby its delicacy might be enhanced.

TABLE A.
SCHEME OF REACTIONS.

Tube	C. S. Fluid	Negative	Positive
1	0.25	0	x xx xxx xxxx
2	0.125	0	0 0 0 x x
3	0.062	0	0 0 0 x 0 x
4	0.031	0	x x x x x
5	None	x	x x x x x

TABLE I.
SURGICAL CASES—SPINAL ANESTHESIA.
Negative Specific History and No Clinical Manifestations
(San Quentin Pen).

Case	Comment	Bl. Was	Fl. Was	mastic
127 cases	Negative history Fluid removed in spinal anesthesia	Neg	Neg	Neg
29648 (Sq.)	"	xx	x	xxxx
23033 (Sq.)	"	—	Neg	xx
29241 (Sq.)	(Tuberculosis)	Neg	Neg	xxxx

TABLE II.
NON-SYPHILITIC DISEASES OF NERVOUS SYSTEM.

Case.	Diagnosis.	Bl. Was.	Cells.	Glob.	Gold.	Fl. Was.	Mastic
50889	Cerebral arteriosclerosis	Neg.	None	0	6	Neg	Neg
52182	Brain Tumor (?) Seepage from ventricle)	Neg	Leucocytosis	—	2	Neg	xxx
8 (Ag)	Alcoholism	—	4	0	—	Neg	Neg
28809 (SQ)	Epilepsy	—	—	—	—	Neg	Neg
28726 (SQ)	Morphinism	—	—	—	—	Neg	Neg
27563 (SQ)	Mental case	—	—	—	—	Neg	Neg
28611 (SQ)	Mental case	—	—	—	—	Neg	Neg
9 (Ag)	Manic depressive	Neg	5	0	—	Neg	Neg
12 (Ag)	Manic depressive	Neg	2	0	—	Neg	Neg
10 (Ag)	Dementia Precoc	Neg	1	0	—	Neg	Neg
11 (Ag)	Dementia Precoc	Neg	0	0	—	Neg	Neg
13 (Ag)	Dementia Precoc	Neg	4	0	—	Neg	Neg
50832	Dis. Sclerosis	Neg	6	x	7	Neg	Neg
49763	Tub. meningitis	—	285	xxx	5.6	Neg	xx
51193	Tub. meningitis	—	114	xxx	5.6.7	Neg	x
51115	Convulsions (?)	—	—	0	3	Neg	Neg
50836	Traumatic Neurosis	—	1	0	—	Neg	Neg
18 (Ag)	Traumatic Neurosis	—	9	x	—	Neg	Neg
52884	Neurasthenia	Neg	2	0	—	Neg	Neg
51970	Neurasthenia	—	2	0	—	Neg	Neg
50722	Neurasthenia	—	0	0	—	Neg	Neg
51746	Hydrocephalus	—	3	0	—	Neg	Neg

TABLE III.
PARESIS.

Case.	Bl. Was.	Cells.	Glob.	Gold.	Fl. Was.	Mastic.
17 (Ag)	Neg	65	xx	—	Neg	Neg
18 (Ag)	xxx	37	xx	—	x	xxxx
19 (Ag)	—	19	xx	—	Neg	xxxx
20 (Ag)	xxx	131	xxx	—	xxx	xxxx
21 (Ag)	xx	18	xx	—	xxx	xxxx
22 (Ag)	xxx	—	—	—	xxx	xxxx
23 (Ag)	xxx	31	xxx	—	xxx	xxxx
24 (Ag)	—	97	xxx	—	x	xxxx
25 (Ag)	xxx	14	xxx	—	xxx	xxxx
26 (Ag)	Neg	25	xxx	—	xxx	xx
51334	Neg	30	x	1.2.3.4.5	xxx	xxxx
51369	—	64	xx	2.3.4	xxx	xxxx
51428	—	13	xx	3	x	xxxx
51492	xxx	82	xxx	1.2.3.6	xxx	xxxx
51552	xxx	21	x	5	x	xxxx
27 (Ag)	xxx	16	xxx	1.2.3.4	Neg	xxxx
32 (Ag)	x	18	—	5	x	xxxx
33 (Ag)	xxx	25	—	—	xxx	xxxx
51800	xx	16	x	—	xxx	xxxx
51876	xxx	—	—	—	xxx	xxxx
52134	xxx	43	x	—	Neg	xxxx
52418	xxx	66	xx	—	xx	xxxx
52525	—	22	xxx	—	xxx	xxxx

TABLE IV.
TABES.

Case	Comment	Bl. Was	Cells	Glob	Gold	Fl. Was	Mastic
27827 (SQ)	Chancre 1914 Salvarsan & Hg Intraspinal Hg	xxx	—	—	1, 2, 3, 4, 5 5	xxx	xxxx
51450	—	—	60	xx	3, 4, 5 5	xxx	xxxx
52027	—	x	76	xxx	—	x	xx0x
30144 (SQ)	Chancre 1901 Several Swift-Ellis	—	—	—	—	Neg	xxxx
52206	Several Swift-Ellis	—	7	x	—	xxx	xxxx
14 (Ag)	"Swift-Ellis"	—	—	—	—	xx	xx0x
15 (Ag)	"Swift-Ellis"	—	—	—	—	x	xx
Wells (SQ)	Hg intraspinal	—	—	—	—	xxx	xxxx
Love (SQ)	"	—	—	—	—	xxx	xxxx
51491	—	x	28	0	—	Neg	xxx
52252	Neg. history	Neg	32	xxx	3, 4 4	xx	xxxx
	Sluggish pupils + Romb. — knee	—	—	—	—	—	—
30144	Chancre 1901 Swift-Ellis	—	—	—	—	Neg	xxxx
30238 (SQ)	Chancre 1890 Hot Springs, Rubs, Hg intravenous	—	—	—	—	xx	xxxx
52518	—	—	76	xxx	—	x	xxxx
53601	—	x	53	x	—	xx	xxxx

TABLE V.
CEREBRAL SYPHILIS.

Case	Comment	Bl. Was	Cells	Glob	Fl. Was	Mastic
50837	Gumma (?)	xxx	2	0	Neg	xx0x
51286	—	—	14	x	x	xxxx
52855	—	—	164	0	xxx	xxxx

TABLE VI.
CEREBROSPINAL SYPHILIS.

Case	Comment	Bl. Was	Cells	Glob	Fl. Was	Mastic
51030	—	xxx	210	xxx	xxx	xxxx
51292	—	xx	46	x	x	xxxx
51781	—	xxx	600	xx	xxx	xxxx
34 (SQ)	—	xxx	—	—	xxx	xxxx

TABLE VII.
DOUBTFUL AND UNDIAGNOSED CASES.

Case	Comment	Bl. Was	Cells	Glob	Gold	Fl. Was	Mastic
27 (Ag)	Paresis (?)	Neg	7	0	—	Neg	Neg
28 (Ag)	Paresis (?)	—	4	0	—	Neg	Neg
29 (Ag)	Paresis (?) sluggish pupil	—	1	0	—	Neg	Neg
30 (Ag)	Paresis (?)	Neg	18	x	—	Neg	Neg
31 (Ag)	Paresis (?) confused and talkative	Neg	23	x	—	Neg	Neg
50842	Congenital lues (?)	Neg	4	0	7, 8 3	Neg	Neg
	Blindness	—	—	—	—	—	—
51052	Tabes (?)	Neg	10	xx	4 3	Neg	xxx
51127	No diagnosis	—	26	xxx	6 3	Neg	Neg
51318	No diagnosis	—	184	0	—	xx	Neg
52107	Tabes (?) + his- tory pupils	Neg	18	0	—	Neg	xxxx

TABLE VIII.
CASES WITH DEFINITE HISTORY OF INFECTION. NEGATIVE FLUID.

Case	Comment	Bl. Was	Cells	Glob	Fl. Was	Mastic
51137	30 years ago (chan- cre, throat, rash) Rigorous Hg therapy No clinical evi- dences	Neg	6	0	Neg	Neg
29903 (SQ)	Chancre 1916 Rash Hg intravenous	—	—	—	Neg	Neg
29304 (SQ)	Chancre 1912	—	—	—	Neg	Neg
51824	Chancre 1915 Was. xxx Meningitis in sec- ondaries. Head- aches now. Re- flexes OK	Neg	3	0	Neg	Neg
51407	Chancre 1900 Local treatment only	xxx	4	0	Neg	Neg
52228	Chancre 20 years Previous Was. pos. Joints	Neg	0	0	Neg	Neg
52714	Iritis—previous Was pos.	xx	11	x	Neg	Neg

TABLE IX.
COMPARATIVE FINDINGS IN PARESIS AND TABES.

Paresis— (Series of 23 cases)	Bl. Was 82%	Cells 13 — 40 av.	Glob 79%	Fl. Was 83%	Mastic 91%
	Positive	131	Positive	Positive	Positive
Tabes— (Series of 15 cases)	20%	7 — 48 av.	59%	80%	93%
	Positive	76	Positive	Positive	Positive